

CLAIMS

1. A form-fill-seal machine comprising:

means for placing product on a first web of packaging film;

means for forming a receptacle having an interior volume and a mouth, with said product in said interior volume and a string zipper installed in said mouth, said first web of packaging film forming at least one wall of said receptacle;

a slider insertion device for inserting sliders on said string zipper;

and

means for sealing said receptacle so that ambient air cannot enter said interior volume.

2. The form-fill-seal machine as recited in claim 1, wherein said receptacle forming means comprise:

means for joining a back of a section of a first flangeless zipper strip of said string zipper to said first web of packaging film along a first longitudinal zone proximal to a first edge thereof; and

means for joining a back of a section of a second flangeless zipper strip of said string zipper to said first web of packaging film along a second longitudinal zone proximal to a second edge thereof.

3. The form-fill-seal machine as recited in claim 2, wherein said receptacle forming means further comprise means for folding said first web of packaging film about halfway between said first and second edges.

4. The form-fill-seal machine as recited in claim 2, wherein said receptacle forming means further comprise means for aligning said first edge with a predetermined portion of said first flangeless zipper strip before said first web is joined to said first flangeless zipper strip.

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5. The form-fill-seal machine as recited in claim 2, wherein said receptacle forming means further comprise means for trimming said first edge after said first web is joined to said first flangeless zipper strip.

5 6. The form-fill-seal machine as recited in claim 1, wherein said receptacle forming means comprise:

means for joining one side of said string zipper to said first web of packaging film along a longitudinal zone proximal to an edge of said first web; and

10 means for joining another side of said string zipper to a second web of packaging film along a longitudinal zone proximal to an edge of said second web.

15 7. The form-fill-seal machine as recited in claim 6, wherein said receptacle forming means further comprise means for placing said second web over said first web and means for joining said first and second webs along three sides of said receptacle.

8. The form-fill-seal machine as recited in claim 6, wherein said receptacle forming means further comprise means for aligning an edge of said first web with a predetermined portion of said first flangeless zipper strip before said first web is joined to said first flangeless zipper strip.

20 9. The form-fill-seal machine as recited in claim 6, wherein said receptacle forming means further comprise means for trimming an edge of said first web after said first web is joined to said first flangeless zipper strip.

25 10. The form-fill-seal machine as recited in claim 1, further comprising means for forming pockets in said first web at spaced intervals therealong, said products being placed in said pockets.

11. A method of making reclosable packages, comprising the following steps:

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placing product on a first web of packaging film;

forming a receptacle having an interior volume and a mouth, with said product in said interior volume and a string zipper installed in said mouth, said first web of packaging film forming at least one wall of said receptacle;

5 inserting sliders on said string zipper; and

sealing said receptacle so that ambient air cannot enter said interior volume.

12. The method as recited in claim 11, wherein said receptacle forming step comprises:

10 joining a back of a section of a first flangeless zipper strip of said string zipper to said first web of packaging film along a first longitudinal zone proximal to a first edge thereof; and

15 joining a back of a section of a second flangeless zipper strip of said string zipper to said first web of packaging film along a second longitudinal zone proximal to a second edge thereof.

13. The method as recited in claim 12, wherein said receptacle forming step further comprises the step of folding said first web of packaging film about halfway between said first and second edges.

20 14. The method as recited in claim 12, wherein said receptacle forming step further comprises the step of aligning said first edge with a predetermined portion of said first flangeless zipper strip before said first web is joined to said first flangeless zipper strip.

25 15. The method as recited in claim 12, wherein said receptacle forming step further comprises the step of trimming said first edge after said first web is joined to said first flangeless zipper strip.

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16. The method as recited in claim 11, wherein said receptacle forming step further comprises the steps of:

joining one side of said string zipper to said first web of packaging film along a longitudinal zone proximal to an edge of said first web; and

5 joining another side of said string zipper to a second web of packaging film along a longitudinal zone proximal to an edge of said second web.

17. The method as recited in claim 16, wherein said receptacle forming step further comprises the steps of:

10 placing said second web over said first web; and

joining said first and second webs along three sides of said receptacle.

18. The method as recited in claim 16, wherein said receptacle forming step further comprises the step of aligning an edge of said first web with a predetermined portion of said one side of said string zipper before said first web is joined to said one side of said string zipper.

19. The method as recited in claim 16, wherein said receptacle forming step further comprises the step of trimming an edge of said first web after said first web is joined to said one side of said string zipper.

20. The method as recited in claim 11, further comprising the step of forming pockets in said first web at spaced intervals therealong, said products being placed in said pockets.

21. A method of making reclosable packages, comprising the following steps:

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(a) providing a continuous elongated web of packaging film having first and second edges that are generally mutually parallel and extend generally horizontally;

5 (b) placing products to be packaged at spaced intervals along one half of said web;

(c) folding said web along a generally central line to form a first folded side and a second folded side interconnected by a folded section, said products being located between said first and second folded sides;

10 (d) joining a back of a continuous length of a first flangeless zipper strip to said web along a first longitudinal zone proximal to said first edge of said web;

(e) joining a back of a continuous length of a second flangeless zipper strip to said web along a second longitudinal zone proximal to said second edge of said web;

15 (f) aligning said first flangeless zipper strip with said second flangeless zipper strip;

20 (g) inserting sliders at spaced intervals along said aligned first and second flangeless zipper strips, said first and second longitudinal zones of said web passing between respective side walls of said slider and said respective backs of said first and second flangeless zipper strips; and

(h) sealing said folded web crosswise at regular intervals located between said products.

22. The method as recited in claim 21, further comprising the following step:

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(i) severing individual packages by cutting said folded web and said first and second flangeless zipper strips at regular intervals, wherein the cut lines generally intersect the respective crosswise seals formed in step (h).

5 23. The method as recited in claim 22, wherein steps (h) and (i) are performed concurrently by a hot knife.

24. The method as recited in claim 21, wherein step (c) is performed before steps (d) and (e).

25. The method as recited in claim 21, wherein step (c) is performed after steps (d) and (e).

10 26. The method as recited in claim 21, wherein step (c) is performed after step (d) and before step (e).

27. The method as recited in claim 21, wherein step (f) is performed after step (c).

15 28. The method as recited in claim 21, further comprising the steps of advancing said web and detecting the lateral position of said first edge of said web at a first location during advancement of said web, said first location being upstream of a location where said first flangeless zipper strip is joined to said web.

20 29. The method as recited in claim 28, further comprising the step of adjusting the position of said first edge at a second location upstream of said first location during advancement of said web, said adjusting step being a function of results of said detecting step.

25 30. The method as recited in claim 21, further comprising the step of trimming said first edge of said web after said web is joined to said first flangeless zipper strip.

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31. A method of making reclosable packages, comprising the following steps:

(a) interlocking a continuous length of a first flangeless zipper strip to a continuous length of a second flangeless zipper strip, thereby forming
5 a continuous length of zipper;

(b) providing a continuous elongated bottom web of packaging film having first and second edges that are generally mutually parallel and extend generally horizontally;

(c) placing products to be packaged at spaced intervals on and
10 along said bottom web;

(d) placing said continuous length of zipper on and along a first longitudinal zone proximal to said first edge of said bottom web;

(e) joining a back of said continuous length of said first flangeless zipper strip to said bottom web along said first longitudinal zone;

(f) laying a continuous elongated top web of packaging film over a
15 portion of said bottom web having said products and said zipper thereon, said top web having first and second edges that are generally mutually parallel and extend generally horizontally, said first edge of said top web being near said first edge of said bottom web;

(g) joining a back of said continuous length of a second
20 flangeless zipper strip to said top web along a second longitudinal zone proximal to said first edge of said top web;

(h) inserting sliders at spaced intervals along said zipper, said first longitudinal zone of said bottom web being disposed between one side wall of
25 said slider and said back of said first flangeless zipper strip, and said second longitudinal zone of said top web being disposed between another side wall of said slider and said back of said second flangeless zipper strip; and

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(i) sealing said top and bottom webs crosswise at regular intervals located between said products.

32. The method as recited in claim 31, further comprising the following step:

5 (j) severing individual packages by cutting said top and bottom webs and said first and second flangeless zipper strips at regular intervals, wherein the cut lines generally intersect the respective crosswise seals formed in step (i).

10 33. The method as recited in claim 31, further comprising the steps of advancing said bottom web and detecting the lateral position of said first edge of said bottom web at a first location during advancement of said bottom web, said first location being upstream of a location where said first flangeless zipper strip is joined to said bottom web.

15 34. The method as recited in claim 33, further comprising the step of adjusting the position of said first edge of said bottom web at a second location upstream of said first location during advancement of said bottom web, said adjusting step being a function of results of said detecting step.

20 35. The method as recited in claim 31, further comprising the step of trimming said first edge of said bottom web after said bottom web is joined to said first flangeless zipper strip.

36. The method as recited in claim 31, further comprising the step of forming pockets in said bottom web at spaced intervals therealong, said products being placed in said pockets.

37. A horizontal form-fill-seal machine comprising:

25 means for providing a continuous elongated web of packaging film having first and second edges that are generally mutually parallel and extend generally horizontally;

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means for placing products to be packaged at spaced intervals along one half of said web;

5 means for folding said web along a generally central line to form a first folded side and a second folded side interconnected by a folded section, said products being located between said first and second folded sides;

means for joining a back of a continuous length of a first flangeless zipper strip to said web along a first longitudinal zone proximal to said first edge of said web;

10 means for joining a back of a continuous length of a second flangeless zipper strip to said web along a second longitudinal zone proximal to said second edge of said web;

means for aligning said first flangeless zipper strip with said second flangeless zipper strip;

15 means for inserting sliders at spaced intervals along said aligned first and second flangeless zipper strips, said first and second longitudinal zones of said web passing between respective side walls of said slider and said respective backs of said first and second flangeless zipper strips;

means for sealing said folded web crosswise at regular intervals located between said products; and

20 means for severing individual packages by cutting said folded web and said first and second flangeless zipper strips at regular intervals, wherein the cut lines generally intersect the respective crosswise seals formed by said sealing means.

25 38. The horizontal form-fill-seal machine as recited in claim 37, further comprising means for advancing said web and means for detecting the lateral position of said first edge of said web at a first location during

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advancement of said web, said first location being upstream of a location where said first flangeless zipper strip is joined to said web.

39. The horizontal form-fill-seal machine as recited in claim 38, further comprising means for adjusting the position of said first edge at a second location upstream of said first location during advancement of said web, the magnitude of the adjustment being a function of results of the detection of lateral position.

40. The horizontal form-fill-seal machine as recited in claim 37, further comprising means for trimming said first edge of said web after said web is joined to said first flangeless zipper strip.

41. A horizontal form-fill-seal machine comprising:

means for interlocking a continuous length of a first flangeless zipper strip to a continuous length of a second flangeless zipper strip, thereby forming a continuous length of zipper;

means for providing a continuous elongated bottom web of packaging film having first and second edges that are generally mutually parallel and extend generally horizontally;

means for placing products to be packaged at spaced intervals on and along said bottom web;

means for placing said continuous length of zipper on and along a first longitudinal zone proximal to said first edge of said bottom web;

means for joining a back of said continuous length of said first flangeless zipper strip to said bottom web along said first longitudinal zone;

means for laying a continuous elongated top web of packaging film over a portion of said bottom web having said products and said zipper thereon, said top web having first and second edges that are generally mutually

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parallel and extend generally horizontally, said first edge of said top web being near said first edge of said bottom web;

5 means for joining a back of said continuous length of a second flangeless zipper strip to said top web along a second longitudinal zone proximal to said first edge of said top web;

10 means for inserting sliders at spaced intervals along said zipper, said first longitudinal zone of said bottom web being disposed between one side wall of said slider and said back of said first flangeless zipper strip, and said second longitudinal zone of said top web being disposed between another side wall of said slider and said back of said second flangeless zipper strip;

means for sealing said top and bottom webs crosswise at regular intervals located between said products; and

15 means for severing individual packages by cutting said top and bottom webs and said first and second flangeless zipper strips at regular intervals, wherein the cut lines generally intersect the respective crosswise seals formed by said sealing means.

20 42. The horizontal form-fill-seal machine as recited in claim 41, further comprising means for advancing said bottom web and means for detecting the lateral position of said first edge of said bottom web at a first location during advancement of said bottom web, said first location being upstream of a location where said first flangeless zipper strip is joined to said bottom web.

25 43. The horizontal form-fill-seal machine as recited in claim 42, further comprising means for adjusting the position of said first edge of said bottom web at a second location upstream of said first location during advancement of said bottom web, the magnitude of the adjustment being a function of results of the detection of lateral position.

44. The horizontal form-fill-seal machine as recited in claim 41, further comprising means for trimming said first edge of said bottom web after said bottom web is joined to said first flangeless zipper strip.

5 45. The horizontal form-fill-seal machine as recited in claim 41, further comprising means for forming pockets in said bottom web at spaced intervals therealong, said products being placed in said pockets.

46. A method for dual manufacture of reclosable packages, comprising the following steps:

10 (a) placing first and second masses of product on first and second laterally inner portions of a web of packaging film;

(b) folding first and second laterally outer portions of said web over said first and second masses of product along first and second folds, with first and second lateral edges of said doubly folded web being disposed parallel to and spaced apart from each other;

15 (c) before or after step (b), joining the backs of first through fourth flangeless zipper strips to first through fourth band-shaped zones, respectively, on said web, said first band-shaped zone being located near said first lateral edge of said web, said second band-shaped zone being located near said second lateral edge of said web, said third band-shaped zone being opposite
20 said first band-shaped zone after said web has been folded, and said fourth band-shaped zone being opposite said second band-shaped zone after said web has been folded;

25 (d) cutting said web along at least one line located in a region between said third and fourth band-shaped zones to form first and second folded webs;

(e) inserting sliders at spaced intervals on a first string zipper formed by said first and third zipper strips and at spaced intervals on a second string zipper formed by said second and fourth zipper strips; and

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(f) cross sealing each of said first and second folded webs at package-length intervals to form first and second package chains respectively.

47. The method as recited in claim 46, further comprising the following step:

5 (g) severing individual packages by cutting said first and second package chains, wherein the cut lines generally intersect the respective crosswise seals formed in step (f).

48. A method for dual manufacture of reclosable packages, comprising the following steps:

10 (a) placing first and second masses of product on first and second portions of a first web of packaging film comprising first and second edges that are generally parallel to each other;

(b) placing a second web of packaging film over said first and second masses of product;

15 (c) before or after step (b), joining the backs of first and second flangeless zipper strips to first and second band-shaped zones, respectively, on said first web, said first band-shaped zone being located between said first edge and said first portion of said first web, and said second band-shaped zone being located between said second edge and said second portion of said first web;

20 (d) before or after step (b), joining the backs of third and fourth flangeless zipper strips to first and second band-shaped zones, respectively, on said second web, said first band-shaped zone of said second web being located generally opposite to said first band-shaped zone of said first web, and
25 said second band-shaped zone of said second web being located generally opposite to said second band-shaped zone of said first web;

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(e) sealing said second web to said first web in a central zone located between said first and second masses of product, said seal being generally parallel to said first and second edges of said first web;

5 (f) cutting said first and second webs along at least one line that intersects said seal to form first and second web structures;

(g) inserting sliders at spaced intervals on a first string zipper formed by said first and third zipper strips and at spaced intervals on a second string zipper formed by said second and fourth zipper strips; and

10 (h) cross sealing each of said first and second web structures at package-length intervals to form first and second package chains respectively.

49. The method as recited in claim 48, further comprising the following step:

15 (i) severing individual packages by cutting said first and second package chains at regular intervals, wherein the cut lines generally intersect the respective crosswise seals formed in step (f).

50. The method as recited in claim 21, wherein said slider is inserted while said first and second flangeless zipper strips are interlocked with each other in the area of insertion.